



LAWRENCE  
LIVERMORE  
NATIONAL  
LABORATORY

# Hands-on lessons in ergonomics for youth

C. Bennett, M. Alexandre, K. Jacobs

September 29, 2005

International Ergonomics Association  
Maastricht, Netherlands  
July 10, 2006 through July 14, 2006

## **Disclaimer**

---

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

Hands-on Lessons in Ergonomics for Youth  
Cheryl Bennett<sup>a</sup>, Melanie Alexandre<sup>a</sup> and Karen Jacobs<sup>b</sup>

<sup>a</sup>Lawrence Livermore National Laboratory  
P.O. Box 808, L-383  
Livermore, CA 94550, USA

[bennett13@llnl.gov](mailto:bennett13@llnl.gov)

<sup>b</sup>Boston University, Sargent College of Health and Rehabilitation Sciences  
Keywords: Interactive session, child, education, implementation process,

Ergonomics risk factors apply to everybody. Numerous adults have experienced disabling injuries related to use of computers and other forms of technology. Now children are using technology even more than adults. Increasingly ergonomics risk factors are being recognized as present in the world of children. Outreach to schools and the surrounding community by employers may help protect the future work force. A growing body of researchers believe that children can benefit from the early introduction of ergonomics awareness and preventative measures.

While individual representatives of the educational system may embrace the concept of introducing ergonomics into the classroom, a number of barriers can prevent implementation of integrated programs. Some of the barriers to introducing ergonomics in schools have been absence of a tie to educational standards, the existing demands on teaching hours, and the absence of easily executable lesson plans. Ergonomics is rarely included in teacher training and professional ergonomics expertise is needed for the development of a class-based program.

As part of Strategic Vision plan for 2025, a National Laboratory identified community outreach and the future workforces as key areas for initiatives. A series of hands-on interactive modules have been developed by professional ergonomics specialists. They are being tested with elementary, middle and high school students. Where possible, the content has been tied to the educational standards in the State of California in the USA.

Currently the modules include grip strength, effective breathing, optimal keyboard and mouse positions, optimizing chairs, posture and movement, backpack safety and safe lifting. Each module takes the students through a related activity or experience. An individual worksheet asks them questions about the experience and guides them to consider implications in their activities of daily living. A module on hearing is under development.

The goal is to have a toolkit that teachers can use in classrooms with minimal training. The kit will come with lesson plans, including background material, key points, questions and answers, possible homework assignments and references. It will include instructions and worksheets for students as well as the materials needed for each module. A pre- and post-test will be administered to test the awareness and understanding of the principles introduced in through the modules.

This interactive session will offer the opportunity to for attendees to participate in some of the modules that have been developed to provide experiential demonstration of ergonomics principles. Attendees will experience ergonomics in action and be able to evaluate the applicability of the process in their own area in the world of ergonomics. The session will consist of 20 minutes introduction, 40 minutes working with the toolkit, finally another 30 minutes for questions or discussion for a total time of 90 minutes.

This work was performed under the auspices of the U. S. Department of Energy by University of California, Lawrence Livermore National Laboratory under contract W-7405-Eng-48.